REMARKS

This application has been carefully reviewed in light of the Office Action dated December 30, 2003. Claims 1 to 6, 8 to 13 and 74 to 76 are in the application, with Claims 7 and 14 to 73 having been canceled, and Claims 74 to 76 having been added. Claims 1 and 8 are the independent claims herein. Reconsideration and further examination are respectfully requested.

The specification and the abstract were objected to for informalities that have been attended to by amendment as recited above. Withdrawal of the objections is respectfully requested.

Applicants wish to thank the Examiner for the indication that Claims 3 to 5, 10 to 12, 17 to 19, 24 to 26, 49, 50, 56, 57, 63, 64, 70 and 71 would be allowable if rewritten into independent form. Applicants have chosen not to rewrite the claims at this time since it is believed that the base claims for each of the foregoing claims are allowable for at least the reasons set forth below.

Claims 1, 2, 6 to 9, 13 to 16, 20 to 23, 27, 28, 46 to 48, 51 to 55, 58 to 62, 65 to 69, 72 and 73 were rejected under 35 U.S.C. § 103(a) over Europe (0 760 289 (Iwata) in view of U.S. Publication No. 2002/0109746 (Murakami). Reconsideration and withdrawal of the rejections are respectfully requested.

The present invention concerns printing an image with a resolution higher than a resolution of nozzles on a print head. According to the invention, a line feeding motor is actuated in a unit of a pulse and a line feeding device, driven by the line feeding motor, is actuated in the unit of the pulse for feeding a recording medium in a unit of a predetermined feeding length fed by an actuating pulse. The predetermined feeding length is defined by (m/k x nozzle pitch), where k is the resolution of the printed image/the

resolution of the nozzles, m and k are integers, and m is greater than k but indivisible by k. In printing the image, the line feeding motor is controlled to actuate in the unit of the pulse and the number of the nozzles utilized for printing the image are controlled. As a result, by controlling both the line feed and the number of nozzles used to print the image in a scan of the print head, the image can be printed with a resolution higher than the resolution of the nozzles themselves. Thus, a higher resolution image can be obtained using conventional nozzle numbers and spacing than could otherwise be provided for in the prior art. For example, a printer having 600 dpi spaced nozzles can print a 1200 dpi image by actuating the line feed motor a predetermined pulse amount (e.g., 1/400 inch).

Referring specifically to the claims, amended independent Claim 1 is a printer that prints an image having a resolution higher than a resolution of nozzles on a print head on a recording medium by scanning the print head across a region of the recording medium a plural-number of times, the print head having nozzles spaced at a nozzle pitch which is a reciprocal number of the resolution of the nozzles and adapted to eject ink from the nozzles on the basis of print data, comprising a line feeding motor that is actuated in a unit of a pulse, a line feeding device, driven by the line feeding motor actuated in the unit of the pulse, for feeding the recording medium in a unit of a predetermined feeding length fed by an actuating pulse, the predetermined feeding length being (m/k x nozzle pitch), where k is the resolution of the printed image/the resolution of the nozzles, m and k are integers, and m is greater than k but indivisible by k, and a controller for controlling the line feeding motor to actuate in the unit of the pulse and for controlling a number of the nozzles utilized for printing the image when printing an image on the recording medium by scanning the print head across the recording medium a plural-number of times.

Amended independent Claim 8 is a method claim that substantially corresponds to Claim 1.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of the present invention, and in particular, is not seen to disclose or to suggest at least the feature of feeding a recording medium in a unit of a predetermined feeding length fed by an actuating pulse, the predetermined feeding length being (m/k x nozzle pitch), where k is the resolution of the printed image/the resolution of the nozzles, m and k are integers, and m is greater than k but indivisible by k.

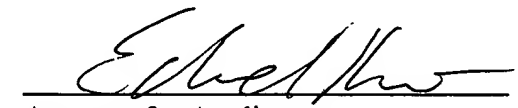
Iwata is merely seen to disclose a printer that can print an image with a resolution of 720 dpi by using a print head having a resolution of 360 dpi and 128 nozzles. In Iwata, after a first printing scan in a first region, the printer feeds the recording medium to a second region by 4.48 mm, which corresponds to half the length of the print head or 63.5 times of the nozzle pitch, and then a second scan is performed. For feeding the recording medium by 4.48 mm (length of one turn of the motor), a step motor is derived by applying 48 pulses (one turn of motor). Therefore, the feeding length by one pulse is 93.4 μm (= 4.48 mm/48), which does not correspond to the nozzle pitch (1/360 inch = 70.6 μm) or the resolution of the printed image (1/720 inch = 35.3 μm). On the other hand, in the present invention, the feeding length driven by one actuating pulse is (m/k x nozzle pitch) such that, for example (1/400 =3/1200 inch), and the feeding length corresponds to the resolution of the printed image (1/1200 inch). Thus, Iwata is not seen to disclose or to suggest at least the feature of feeding a recording medium in a unit of a predetermined feeding length fed by an actuating pulse, the predetermined feeding length being (m/k x nozzle pitch), where k is the resolution of the printed image/the resolution of the nozzles, m and k are integers, and m is greater than k but indivisible by k.

Murakami merely discloses a printer in which a print head having a 300 dpi resolution can print an image of a resolution of 600 dpi. The print head has two ejection opening arrays for each print head, where one array is offset to another array by half a pitch of the ejection opening. However, Murakami is not believed to disclose or to suggest at least the feature of feeding a recording medium in a unit of a predetermined feeding length fed by an actuating pulse, the predetermined feeding length being (m/k x nozzle pitch), where k is the resolution of the printed image/the resolution of the nozzles, m and k are integers, and m is greater than k but indivisible by k. Thus, any permissible combination of Iwata and Murakami is not seen to have disclose the present invention.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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